

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII**

In the Matter of the Application of)
HAWAII ELECTRIC LIGHT COMPANY, INC.) Docket No. 05-0315
For Approval of Rate Increases and)
Revised Rate Schedules and Rules.)
_____)

**HELCO
VOLUMINOUS RESPONSES TO
CONSUMER ADVOCATE
INFORMATION REQUESTS**

BOOK 6 OF 15

January 12, 2007



CA-IR-23

Ref: HELCO-203, page 5, "Market Analysis of Large Power (Schedule P) Accounts."

Please provide the following information regarding HELCO's market analysis associated with the test year sales forecast:

- a. A complete copy of the "market analysis workpapers" and other documents that were relied upon in preparing the forecast.
- b. A comparison of actual annual sales kWh sales volumes in each of the past three calendar years 2003, 2004 and 2005 to the test year projected sales for each Schedule P customer.
- c. Explain and quantify each known change in demand for individual Schedule P customers, relative to historical actual demand levels, that was incorporated into HELCO's test year forecasted sales.
- d. Please provide complete copies of all reports, correspondence, workpapers and other documents relied upon by Company personnel to prepare the adjustments set forth in part (c) of your response to this information request.

HELCO Response:

The information requested includes confidential customer information, and will be provided pursuant to Protective Order No. 22593, dated June 30, 2006.

- a. See pages 2 to 6 of this response.
- b. See pages 7 to 12 of this response.
- c. See response to part d.
- d. The requested information is confidential and will be provided pursuant to Protective Order No. 22593, dated June 30, 2006. Because the requested information is voluminous, it is available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the requested information.

The requested information is confidential and will be provided pursuant to Protective Order No. 22593, dated June 30, 2006.

The information requested in subparagraph d is voluminous as well as confidential, and is available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the requested information.



CA-IR-33

Ref: T-4, page 19, lines 14 - 25 and page 20, lines 1 - 16, HELCO 402.

- a. Please provide actual fuel prices for industrial fuel oil and diesel oil by month, since January 1, 2005.
- b. Please provide excerpts of pricing provisions for both industrial fuel oil and diesel fuel pursuant to the Chevron and Tesoro fuel contracts, as well as illustrative calculations, input value documentation and supporting market price or index documentation for the Company's determination of test year unit prices. Please include taxes, ocean transportation, land transportation, petroleum terminalling and wharfage costs that are included to determine the delivered-to-plant price shown in HELCO 402.
- c. Please provide a copy of confidential Workpaper HELCO-WP-402 pages 1 through 3.

HELCO Response:

The information requested in parts a., b., and c. above is confidential and will be provided pursuant to Protective Order No. 22593, dated June 30, 2006. Because the information is voluminous, it is available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the requested information.

- a. The actual fuel prices for January 2005 to August 2006 on confidential pages 3-56 show the fuel base price, taxes, ocean transportation, land transportation, terminalling (storage), and wharfage costs.
- b. The confidential information available for inspection include:
 - Excerpts from Chevron fuel contract regarding pricing provisions and illustrative calculation for Industrial Fuel Oil. See pages 57-60.
 - Excerpts from Tesoro fuel contract regarding pricing provisions and illustrative

- calculation for Industrial Fuel Oil. See pages 61-64.
- Excerpts from Chevron fuel contract regarding pricing provisions and illustrative calculation for Diesel. See pages 65-73.
 - Excerpts from Tesoro fuel contract regarding pricing provisions and illustrative calculation for Diesel. See pages 74-81.
 - Excerpts from the freight (ocean transportation) contract pricing provisions. See pages 82-85.
 - Excerpts from the Chevron terminalling services contract provisions. See pages 86-87.
 - Explanation of the computation of wharfage fees paid by HELCO. See pages 88-89.
 - Explanation of the computation of the land transportation costs and excerpts from the trucking contracts and tariffs. See pages 90-97.
 - Market price support documentation for actual 2005 monthly fuel prices, as well as February 2006, which illustrates the derivation of the fuel base price. See pages 98-103.
- c. Confidential workpaper HELCO-WP-402, pages 1 through 3 are available for inspection and are provided on pages 104-106.

**Confidential Information Deleted
Pursuant to Protective Order No. 22593**

The requested information is confidential and will be provided pursuant to Protective Order No. 22593, dated June 30, 2006. Because the requested information is voluminous, it is available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the requested information.





CA-IR-38

Ref: HELCO-WP-404.

- a. Please explain any tests or related data that was used to develop the Heat Rate Constants for each unit.
- b. Please provide copies of all workpapers, analyses and source documents that support this information. The workpapers and analysis should set forth all computations, state all assumptions made in performing such calculations, and explain the basis for such assumptions.

HELCO Response:

- a. The heat rate constants for all but the small diesels and Hamakua Energy Partners are derived from efficiency tests. These efficiency tests involve operating the generating unit at a fixed output for a period of time and measuring the fuel use during the period. The fuel use is converted to BTU. These tests provide BTU/HR data points that are then used to derive heat rate curves. Over time these curves are refined with the collection of additional data. At times the additional data suggests a refinement of the heat rate constants to better conform to the measured curve. On occasion a data point is not consistent with the existing curve and conflicts with other measured data points. Such "bad" data points are not included in the heat rate derivation and are assumed to be the result of errors in the testing, unless verified with subsequent tests.
 1. Steam units: The heat rates of the steam units have been more variable over time as efficiency degrades between overhauls. The heat rates for the steam units have been derived from pre-overhaul and post-overhaul tests and thus represent an average efficiency. A large amount of historical data has been collected over time, allowing good modeling of the intrinsic heat rate curve shape.
 2. Gas turbines: Fewer tests have been conducted as the results tend not to vary between

overhauls. Historical data points are used along with more recent tests to confirm the inherent curve shape in the same manner as is done for steam turbines.

3. Diesel units: One heat rate curve is used for all of the EMD units. This heat rate curve is based upon the heat rate curve supplied from the manufacturer. Heat rate tests have been performed on the units, and the results from these tests correlated reasonably well with the manufacturer supplied heat rate curve, although the heat rate tests for the EMD units inherently had more error than tests on the larger units, due to the relatively small amount of fuel consumed during the tests. Diesel 11 and the distributed generators are used only under emergency dispatch when HELCO has immediate, short-term capacity requirements on the system. Thus, the heat rate curves for these units are not required for the economic dispatch and unit commitment considerations. The use of fuel in the distributed generators is 70 gallons per hour at 1 MW output (the fixed load level).
 4. Hamakua Energy Partners: The "heat rate constants" were derived such that the resulting cost curve matches the pricing curve for the particular configuration. The curve includes the 2% discount in the contract.
- b. The requested information is confidential and will be provided pursuant to Protective Order No. 22593, dated June 30, 2006. Because the requested information is voluminous, it is available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to inspect the requested information. The heat rate constants and equivalent heat rate curves for HEP in combined cycle are shown in HELCO-WP-545, pages 22-25 based on its pricing curve. The confidential information will include data for HEP as a simple cycle combustion turbine, as well as efficiency test data, plotted against the curve for

HELCO units CT1, CT2, CT3, CT4, CT5, EMD diesels, Hill 5, Hill 6, Puna Steam, Shipman 3, and Shipman 4. In some of the cases an ABC DERIVATION sheet is used to help derive the ABC data from 3-6 data points but in all cases the final ABC curve fit to the data points is a judgment made by an experienced engineer as the curve derivation result may or may not result in a good fit to the data. The dispatch programs used by HELCO and the production simulation require the constants be positive.

Confidential Information Deleted
Pursuant to Protective Order No. 22593

The requested information is confidential and will be provided pursuant to Protective Order No. 22593, dated June 30, 2006. Because the requested information is voluminous, it is available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the requested information.



CA-IR-49

Ref: HELCO T-5, pages 33-36, Generation Asset Management ("GAM") Program.

Please provide the following documents related to the GAM Program:

- a. A copy of the contract(s) for Sargent & Lundy to perform the initial engineering analysis.
- b. A copy of all reports prepared by Sargent & Lundy for HELCO in connection with initiation and continued support of GAM.
- c. A complete and detailed statement of all GAM Program initiatives, objectives, specific projects and planned milestones at Program inception in 2003.
- d. A copy of summary reports produced by HELCO for senior management to track performance relative to GAM Program objectives, project schedules and milestones in each year since 2003.
- e. The anticipated annual GAM Program spending by project in each year 2003 through 2008, at the inception of the Program.
- f. The actual GAM Program spending by project in each year since inception in 2003, broken down between capital and expense spending on each project in each year.
- g. A detailed description of HELCO's overall status relative to each of the established GAM Program objectives and milestones as of May 2006.

HELCO Response:

Attachments 1 through 14 are being provided in response to CA-IR-49, subparts a. through g.

The requested information is confidential and will be provided pursuant to Protective Order No. 22593, dated June 30, 2006. Because the requested information is voluminous, the attachments are available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the requested information. (See page 9 of this response for a list of the attachments.)

- a. See Attachment 1 for a copy the Work Authorization No. HGA-02-001 under Master

Agreement No. YA-96-23 between HELCO and Sargent and Lundy, LLC ("S&L"), dated 8/8/02, for the initial engineering analysis. See also response to subparts b. through g. and Attachment 6 (S&L Proposal No. 00270-874, dated 5/26/04).

b. through g. HELCO received three versions of the S&L Generation Asset Management Study report in connection with the GAM program that was initiated in 2003. The first draft of the report, S&L Report No. SL-007524, First Draft, 12/20/02 (Attachment 2), was reviewed by HELCO Production and HECO Engineering personnel. The consolidated review comments were annotated on first draft report, and HECO Engineering provided this marked-up version of the first draft report to S&L along with the following comments:

"GENERAL:

Our major concern is that the GAM report generally concludes that all of the HELCO units (including Shipman 3 & 4, the diesel engines, and Puna Steam) are very reliable in comparison to industry experience, when in reality it is exactly the opposite. The historical forced outage data and statistics from the 1990's were used. These statistics were based on definitions that were unique to HELCO and should not have been directly compared to industry experience. Since January 1, 2002, HELCO has been compiling reliability statistics using definitions that agree with U. S. electric power industry guidelines. Since January 1, 2002, HELCO has been operating their units with duty cycles similar to those expected for future years. The results have been humbling. Forced outage rates are very poor and indicative of the relatively poor condition of the units.

The reports need to be proof-read and edited.

More substance should be provided in the report. If possible, innovative solutions should be addressed, for example, the use of thermographic photography.

Include an Executive Summary that includes a summary of the work that needs to be done and the estimated costs.

The report should prioritize the work and include specification of "must do" items.

Forced outage data may be quite misleading because many starts on Shipman and diesels were accomplished with the maintenance crews present to assist the start-ups of units with known problems.

ELECTRICAL:

The report should reference IEEE or ANSI Test Standards where applicable. Much of the wording is trying to explain these test standards and procedures.

SHIPMAN AND PUNA STEAM UNITS:

The condition of Shipman 3 & 4, and Puna Steam were described as indeterminate (requires inspection). However, the Conclusion does not mention this limitation. It would be difficult to assess these units without knowing the condition of these units. A stronger discussion should be made on the cost and difficulty of getting spare parts for these units, particularly Shipman 3 & 4."

HELCO performed a detailed review of the scope, relative priority, and estimated costs of the work recommended by S&L in the first draft of the report (Attachment 2). The recommended work was comprised of many individual projects. HELCO generally agreed with the findings and recommendations of S&L. The estimated costs for many of the individual projects appeared to be high or low, however, the total cost of the recommended work appeared reasonable. The HELCO review formed the basis for a three-year GAM program (2003-2005) to be budgeted, planned, and implemented by HELCO. Work started in early 2003 on the highest priority projects. Attachment 3 is a copy of an internal

HELCO budget presentation dated July 15, 2003, that summarizes the 3-year GAM program. HELCO subsequently received second and third versions of the S&L report: S&L Report No. SL-007524, Rev, 0, 8/18/03 (Attachment 4), and S&L Report No. SL-007524 Rev.1, Final, 5/05/04 (Attachment 5).

Based on S&L Proposal No. 00270-874 dated 5/26/04 (Attachment 6), HELCO and S&L executed Work Authorization No. HGA-04-007 01 01 01 (Attachment 7). This study built upon the prior work and included considerations of additional units (e.g., Hill 5, Hill 6, CT-4, and CT-5), an extended study period (e.g., through 2030), and consequences of system disturbances. HELCO received three versions of reports in connection with this follow-on GAM study from S&L, including: S&L Report No. SL-008335 Rev3, September 2004 (Attachment 8). The two earlier versions did not factor into revised plans, but are available for review upon request.

As part of HELCO's annual budget process in late 2003/early 2004, the GAM program was decelerated from 3 years (2003-2005) to 6 years (2003-2008). This was based, in part, on the expectation that CT-4 and CT-5 could provide added generating capacity in the near term and that HELCO may not have to rely on the older generating units to meet system demand until 2007 or later. Attachment 9 is a copy of an internal HELCO budget presentation dated April 30, 2004, that summarizes the 6-year GAM program as of 4/30/04. However, it was subsequently determined in May 2004, that the older generating units would need to be relied upon to a greater extent in the near term based on greater than expected load growth on the HELCO system, and the termination of the short-term (2000-2004) Power Purchase Agreement with Hilo Coast Power Company (reference PUC Docket No. 99-0346) provided the opportunity and additional reasons to review the timing of the

GAM work on the older generating units. Consequently, in May and June 2004, the GAM program was expanded to include additional projects needed and/or potential projects, and the target completion date was advanced to the end of 2006. The expanded scope included:

- (1) Puueo Hydroelectric Plant Rehabilitation Project (Reference PUC Docket No. 03-0222);
- (2) Repowering of the Lalamilo Wind Energy Facility;
- (3) Upgraded turbine controls at CT-2, CT-3, CT-4, and CT-5;
- (4) Hill 5 Generator Stator Rewind(Reference PUC Docket No. 04-0015); and
- (5) Asset Optimization Program (discussed direct testimony, HELCO T5 pages 38-41, and in response to CA-IR-51).

On 5/7/04, HELCO received authorization from HECO to proceed with the expanded, accelerated GAM Program for a budget not to exceed \$77,010,407. This budget also included other O&M costs for Production Operations. HELCO reviewed and revised the GAM program and produced a plan on 6/30/04 ("Plan 6/30/04") that was consistent with the authorization. As illustrated in Attachment 10, the budget for the "Plan 6/30/04" totaled \$75,679,206. There were variances between the authorized budget and the "Plan 6/30/06" budget for individual plants and the subject year(s). The variances resulted from several factors, including: (a) some redundancies at the project level in the original authorization; (b) refined costs estimates for specific projects; (c) carryover of work scheduled for 2003; (d) elimination of selected projects; and (e) timing issues.

Between June 2004 and November 2005, HELCO made significant progress on the implementation of the GAM program. The GAM program was directly overseen by the HELCO Production Manager throughout this time period. Periodically, the HELCO Production Manager informally briefed HELCO and HECO senior management on the technical progress, accomplishments, and financial status related to the implementation of

the GAM Program. Significant accomplishments included the following:

- Completed repair of the Hill 5 generator
- Completed installation on new electrical switchgear at Shipman Plant
- Completed retubing of Shipman 3 & 4 boilers
- Completed Puueo Hydroelectric Plant rehabilitation
- Completed upgrading of turbine controls at CT-3, CT-4, and CT-5
- Completed overhauling of several EMDs
- Completed Asset Optimization Study – Phase 1
- Completed upgrade of Hill Plant waste water treatment facility
- Completed CT-2 major field inspection – Phases 1 & 2

The financial status of the GAM Program was tracked and reported upon a periodic basis relative to the budget for the “Plan 6/30/04” (see Attachment 10). As shown in Attachment 11, as of 8/31/04 the total cost of the GAM Program had increased by \$303,156 to \$77,313,563 due to changes in labor rates and overhead costs that occurred between the reporting periods. Also shown in Attachment 11 is the subtotal of GAM projects costs that total \$37,110,816 as of 8/31/04. Of this total, \$14,492,713 was for O&M projects and \$22,618,103 was for capital projects, respectively. Future financial reports to HELCO and HECO managements were made relative to these authorizations. For example, Attachment 12 shows financial reporting as of 11/16/04 and 3/04/05. As of 3/4/05, the Plan for GAM projects was \$34,140,837, or about \$3 million less than the corresponding authorization of \$37,110,816. The \$3 million generally represented a timing shift from 2005 to 2007 (outside the window of authorization for the GAM Plan) for the potential Lalamilo Wind Energy Facility repowering.

In Attachment 12, the GAM program budget authorized and adjusted on 8/31/04 is presented in direct comparison with the GAM Plan as of 11/16/04 and as of 3/4/05. Also presented are the variances between the last two reporting periods, and these are explained in the notes accompanying the table in Attachment 12. Similarly, in Attachment 13 the GAM program budget authorized and adjusted on 8/31/04 is presented in direct comparison with the GAM Plan as of 5/23/05 and 8/30/05. Of particular note is that the line item project for the Lalamilo Wind Energy Facility repowering was deleted from consideration in the time period for the GAM program, and thus, it was adjusted to zero for this budget summary presentation. The total cost of the GAM program as of 8/30/05 was less than that authorized a year earlier although the project variances were significant as explained in the notes accompanying the table.

In July 2005, as part of HELCO's annual budget process it was decided to slow down the pace of the GAM program and to extend the completion date from 2006 to 2008. This decision was in recognition of the reduced urgency in completing the projects as evidenced by: (1) Improved reliability of the HELCO generating system as discussed in direct testimony (see direct testimony HELCO T-5, pages 20-24); (2) one year of successful commercial operation of CT-4 and CT-5 at high levels of reliability; and (3) experience gained operating the HELCO system with increased dependence on the older generating units and without having Hilo Coast Power Company available since its Power Purchase Agreement terminated 12/31/04.

In Attachment 14, the GAM program budget authorized and adjusted on 8/31/04 is presented in direct comparison with the GAM Plan as of 8/30/05 and as of 11/30/05. The variances are presented and explained in the notes accompanying the table.

For 2006, the pace of GAM work has slowed, due in part to numerous unscheduled outages and deratings by Independent Power Producers. Also a factor is the loss of several support engineering staff at HECO which was assigned in part to assist with GAM project engineering. Thus, GAM projects are being performed during scheduled unit outages. To be completed this year are the retrofit of low smoke nozzles to CT-1, and installation of a new demineralized water treatment system for Hill Plants 5 & 6 to replace the evaporators. The spare EMD engine overhaul has been completed. The Shipman 4 static exciter installation will be completed during its overhaul period in October 2006. The #2 Shipman fuel tank will be cleaned and inspected in conjunction with the completion of the pipeline PIG station at Shipman Plant.

The requested information is confidential and will be provided pursuant to Protective Order No. 22593, dated June 30, 2006. Because the requested information is voluminous, the attachments are available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the requested information.

Attachments to the Response to CA-IR-49

1. S&L Work Authorization HGA 02-001, 8/8/02 (39 pages)
2. S&L report, first draft, Report No. SL-007524, 12/20/02 (275 pages)
3. HELCO Budget Presentation, 7/15/03 (18 pages)
4. S&L report, Rev.0, Report No. SL-007524, 8/18/03 (220 pages)
5. S&L report, Rev 1, Final, Report No. SL-007524, 5/05/04 (341 pages)
6. S&L Proposal No. 00270-874, 5/26/04 (11 pages)
7. S&L Work Authorization HGA 04-007 01 01 01, 5/04 (3 pages)
8. S&L report, Report No. SL-008335 Rev. 3, 9/04 (149 pages)
9. HELCO Budget Presentation, 4/30/04 (6 pages)
10. HELCO Budget Authorization and Plan, 6/30/04 (1 page)
11. HELCO Budget Update, 8/31/04 (2 pages)
12. HELCO Budget Update, 11/16/04 and 3/4/05 (3 pages)
13. HELCO Budget Update, 5/23/05 and 8/30/05 (3 pages)
14. HELCO Budget Update 11/30/05 (3 pages)

